General Specifications

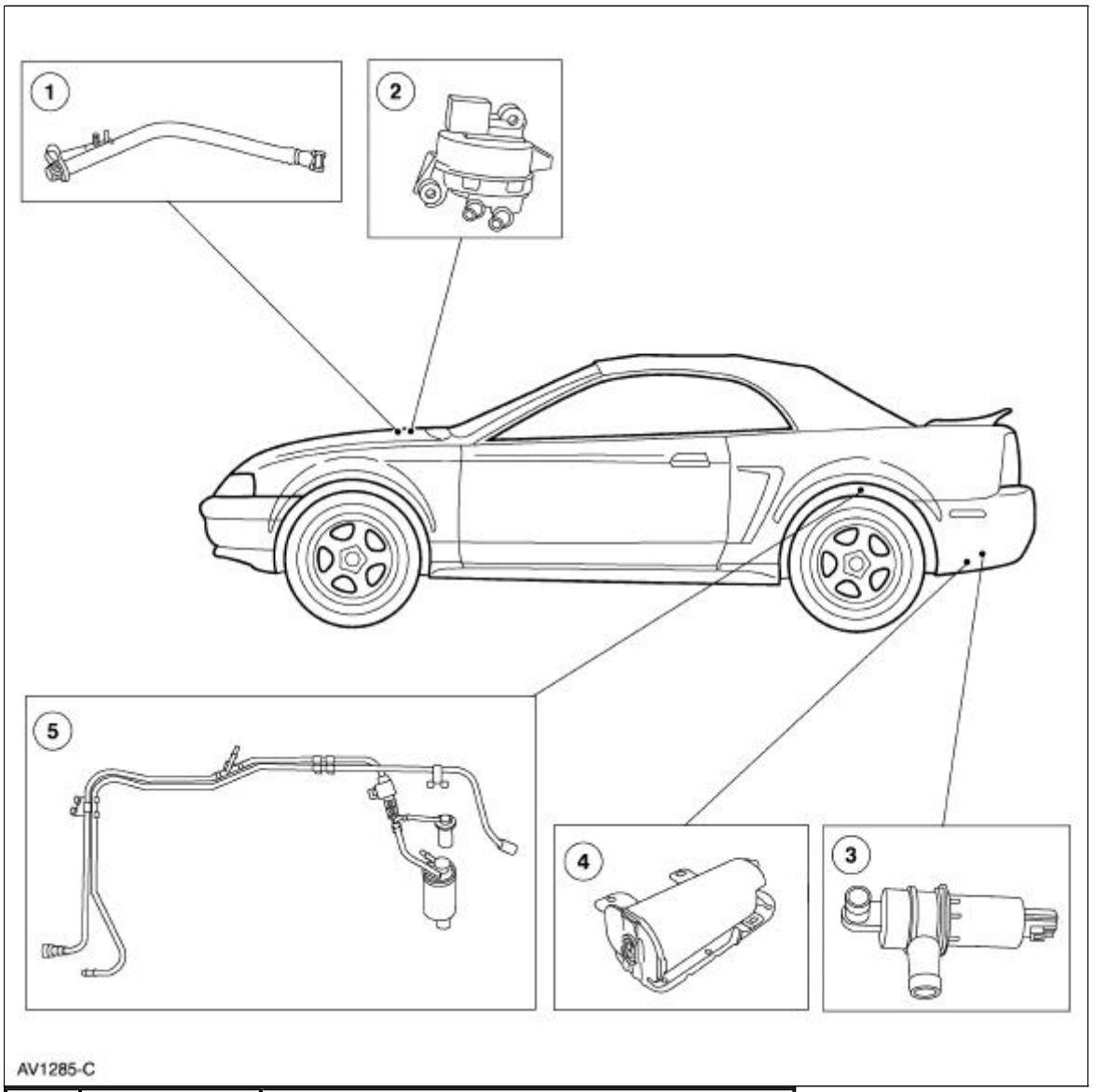
Item	Specification
MERPOL® O-ring Seal Lubricant	ESE-M99B144-B

Torque Specifications

Description	Nm	lb-ft	lb-in
Evaporative emissions canister and bracket assembly bolts	25	18	—
Evaporative emission canister purge valve nuts	7	—	62

Evaporative Emissions

Component Location



Item	Part Number	Description
1	9F980	Evaporative emission test port
2	9C915	Evaporative emission canister purge valve
3	9F945	Canister vent solenoid
4	9D653	Evaporative emission canister
5	9C047	Fuel vapor control valve tube assembly

The evaporative emission system:

- is equipped with an on-board refueling vapor recovery (ORVR) system.

- prevents hydrocarbon emissions from reaching the atmosphere.
- stores fuel vapors in the evaporative emission (EVAP) canister that are generated during vehicle operation or hot soak, or vehicle refueling, until they can be consumed by the engine.
- routes the stored fuel vapors to the engine during engine operation.
- is controlled by the powertrain control module (PCM) which uses various sensor inputs to calculate the desired amount of purge flow. The PCM regulates the purge flow, induced by the application of intake manifold vacuum, by varying the duty cycle applied to the EVAP canister purge valve.
- has an evaporative emission test port for test purposes.

The fuel vapors are routed:

- from the fuel tank through the fuel vapor control valve and fuel vapor vent valve.
- to the EVAP canister through a vapor line.
- to the engine when the EVAP canister purge valve is opened by the PCM.

The fuel tank pressure (FTP) sensor:

- monitors the pressure levels in the fuel tank.
- communicates the pressure reading to the PCM during the OBDII leak test.
- is located in-line above the fuel tank and is serviced as part of the fuel vapor control valve tube assembly.

The evaporative emission canister:

- is located in the left rear quarter panel.
- contains activated carbon.
- stores fuel vapor.

The fuel tank filler cap:

- relieves system pressure above 14 kPa (56.21 inches H_2O).
- relieves system vacuum below 3.8 kPa (15.26 inches H_2O).

The canister vent solenoid:

- is normally open.
- seals the EVAP system for the inspection and maintenance (I/M 240) test and OBDII leak and pressure tests.
- is mounted to the evaporative emission canister.
- is repaired as a separate item.

The evaporative emission (EVAP) canister purge valve:

- is normally closed.
- regulates purging of the EVAP canister.
- is controlled by the PCM.

- is located in the right front inner fender well.

The fuel vapor control valve tube assembly:

- consists of the fuel vapor control valve, fuel vapor vent valve and an in-line fuel tank pressure sensor.
- prevents suspended liquid fuel from being drawn into the evaporative emission canister along with the fuel vapors.
- returns the liquid to the fuel tank.
- includes a fresh air transfer tube routing fresh air between the canister vent solenoid hose and the fuel tank filler pipe assembly.
- requires two grommets to seal the fuel vapor control valve and fuel vapor vent valve to the fuel tank.

The evaporative emission (EVAP) system monitor:

- is a self-test strategy within the PCM, which tests the integrity of the EVAP system.
- monitors the EVAP system for leaks.
- monitors electronic EVAP components for irrationally high or low voltages.
- monitors for correct EVAP system operation.
- utilizes intake manifold vacuum to test the EVAP system and involves several stages.

The evaporative emission (EVAP) test port:

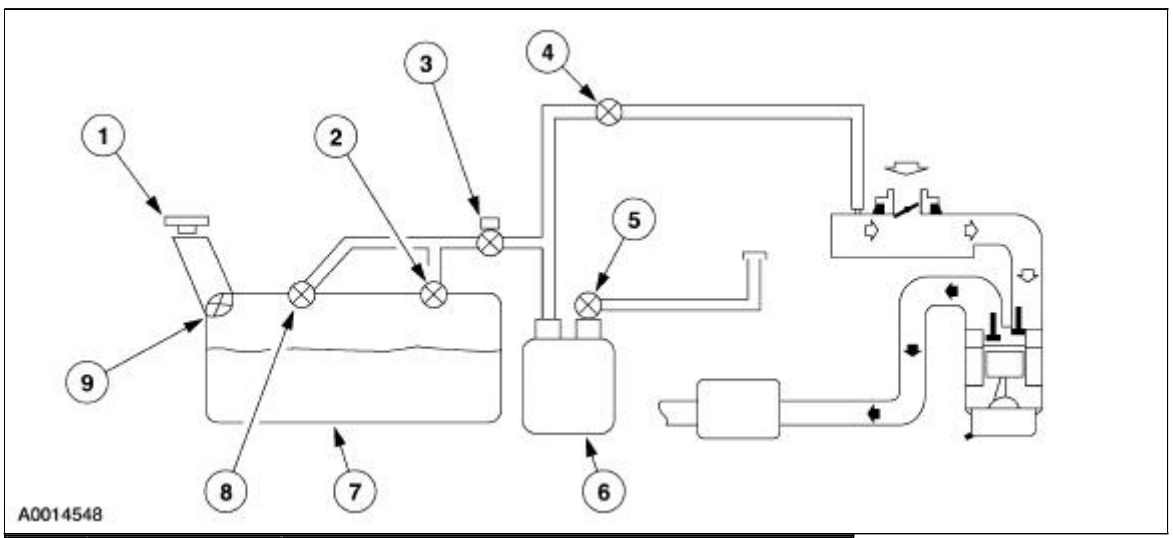
- is used to connect the Evaporative Emission System Leak Tester to the EVAP system.
- is located on the EVAP canister purge outlet tube near the EVAP canister purge valve.

Evaporative Emissions

Special Tool(s)

ST2116-A	Evaporative Emission System Leak Tester 310-F007 (134-00056) or equivalent
ST2332-A	Worldwide Diagnostic System (WDS) 418-F224, New Generation STAR (NGS) Tester 418-F052, or equivalent scan tool

Evaporative Emission System



Item	Part Number	Description
1	9030	Fuel filler cap
2	9B593	Fuel vapor vent valve
3	9C052	Fuel tank pressure sensor
4	9C915	Evaporative emission canister purge valve
5	9F945	Canister vent solenoid
6	9D653	Evaporative emission canister
7	9002	Fuel tank
8	9B190	Fuel vapor control valve
9	9189	Fuel filler pipe check valve

Principles of Operation

Evaporative Emission (EVAP) Canister Purge Valve

The EVAP canister purge valve is controlled by the powertrain control module (PCM). The EVAP canister purge valve controls the flow of fuel vapors from the EVAP canister to the engine intake manifold during various engine operating modes. The EVAP canister purge valve is normally closed.

Evaporative Emission (EVAP) Canister

Fuel vapors from the fuel tank are stored in the EVAP canister. When the engine is running, the vapors are purged from the EVAP canister for combustion.

Canister Vent Solenoid

During the Evaporative Emission (EVAP) System Test Monitor, Evaporative Emissions Repair Verification Drive Cycle, and the Evaporative Emission System Leak Test, the canister vent solenoid is closed to allow a vacuum to be drawn on the fuel tank at a specific level. The canister vent solenoid is normally open.

Fuel Tank Pressure (FTP) Sensor

The fuel tank pressure sensor is used to measure the fuel tank pressure during the Evaporative Emissions Monitor Test. The fuel tank pressure sensor is mounted in the fuel vapor control valve tube as it crosses over the fuel tank.

Fuel Vapor Control Valve

The fuel vapor control valve is normally between the EVAP canister and the fuel vapor vent valve. Its function is to prevent the flow of liquid fuel into the EVAP canister or up to the canister purge valve during refueling, and to prevent the collection of liquid fuel in the fuel vapor hoses by overfilling the fuel tank.

Fuel Vapor Vent Valve (FVV) Assembly

The fuel vapor vent valve (FVV) assembly is mounted on the top of the fuel tank. It is used to control the flow of fuel vapors entering the EVAP system. The head portion of the assembly prevents the fuel tank from overfilling during refueling. The assembly also has a spring float, which prevents liquid fuel from entering the vapor delivery system under severe handling or vehicle rollover conditions. In the upright position, the open bottom of the float will lift and shut off the orifice. Under severe handling conditions, the spring will push the float closed when angles allow liquid fuel to reach the orifice. In a rollover condition, the weight of the open bottom float and spring pressure will close the orifice.

Fuel Filler Pipe Check Valve

The fuel filler pipe check valve is an intricate part of the fuel filler pipe. It is intended to prevent liquid fuel from re-entering the fuel filler pipe from the fuel tank on refueling or roll over conditions.

Fuel Filler Cap

The fuel filler cap is used to prevent fuel spill and to close the EVAP system to the atmosphere.

Evaporative Emission System Monitor

When a fault occurs, the EVAP system monitor is reset to NO and a diagnostic trouble code (DTC) is set in the PCM memory. After the DTC is repaired, the vehicle drive cycle must be completed to reset the monitor in preparation for inspection and maintenance testing.

EVAP Emission System Leak Test

To start the testing, conditions of stable purging and vehicle speed must be satisfied. During the first stage, the canister vent solenoid is closed, while the EVAP canister purge valve remains open, applying and building vacuum in the system as indicated by the FTP sensor. This phase checks for major leaks in the EVAP system.

In the second stage, the EVAP canister purge valve closes and the system looks for minimal decay rate in the EVAP vacuum, indicating the absence of any small EVAP system leaks.

The last stage is entered only if stage two of the leak test has failed and checks whether the failed test was due to excess vapor generation. It monitors fuel vapor generation rate. Initially, the canister vent solenoid is opened to equalize EVAP system pressure to atmosphere. Then the canister vent solenoid is closed, allowing pressure to build if vapor generation is present in sufficient quantity. If the rate of generation is found to be too high, the EVAP running loss system leak test is aborted. If not, then a small leak is diagnosed.

On-Board Refueling Vapor Recovery (ORVR) Evaporative Emission (EVAP) System

The basic elements forming the ORVR system are as follows:

- The fuel filler pipe forms a seal to prevent vapors from escaping the fuel tank while liquid is entering the fuel tank. Liquid in the one inch diameter tube blocks vapors from rushing back up the fuel filler pipe.
- A fuel vapor control valve controls the flow of vapors out of the fuel tank. The valve closes when the liquid level reaches a height associated with fuel tank usable capacity. The valve accomplishes the following:
  - limits the total amount of fuel that can be dispensed into the fuel tank
  - prevents liquid gasoline from exiting the fuel tank when submerged (as well as when tipped well beyond a horizontal plane as part of the vehicle rollover protection in road accidents)
  - minimizes vapor flow resistance during anticipated refueling conditions
- Fuel vapor tubing connects the fuel vapor control valve to the EVAP canister. This routes the fuel tank vapors, displaced by the incoming liquid, to the EVAP canister.
- A check valve in the fuel filling system prevents liquid from rushing back up the fuel filler pipe during the liquid flow variations associated with the filler nozzle shut-off.

Between refueling events, the EVAP canister is purged with fresh air so that it may be used again to store vapors accumulated during engine soaks or subsequent refueling events. The vapors drawn off of the carbon in the EVAP canister are consumed by the engine.

Inspection and Verification

1. Verify the customer concern is with the evaporative emission (EVAP) system.
2. Visually inspect for the following obvious signs of mechanical damage.

Visual Inspection Chart

Mechanical
• Fuel filler cap • EVAP test port • EVAP canister or canister vent solenoid

- EVAP lines or hoses
- Vacuum lines or hoses

3. If the concern remains after the inspection, connect the scan tool to the data link connector (DLC) located beneath the instrument panel and select the vehicle to be tested from the scan tool menu. If the scan tool does not communicate with the vehicle:
   - check that the program card is correctly installed.
   - check the connections to the vehicle.
   - check the ignition switch position.
4. If the scan tool still does not communicate with the vehicle, refer to the scan tool manual.
5. Carry out the DATA LINK DIAGNOSTICS test. If the scan tool responds with:

- CKT914, CKT915 or CKT70 = ALL ECUS NO RESP/NOT EQUIP, refer to Section 418-00 .
- NO RESP/NOT EQUIP for PCM, refer to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.
- SYSTEM PASSED, retrieve and record the continuous diagnostic trouble codes (DTCs), erase the continuous DTCs and carry out the PCM KOEO self-test.

6. If the DTCs retrieved are related to the concern, go to the PCM Diagnostic Trouble Code (DTC) Index to continue diagnostics.
7. If the concern remains after the inspection, determine the symptom. GO to Symptom Chart .

PCM Diagnostics Trouble Code (DTC) Index

DTC	Description	Source	Action
P0442	Small leak detected in EVAP system (As small as 1.02 mm [0.040 inch])	PCM	Go To Pinpoint Test A .
P0455	Major leak or no flow detected	PCM	Go To Pinpoint Test B .
P0457	Check for missing or leaking fuel filter cap	PCM	Go To Pinpoint Test A .
P1443	Very small or no purge flow detected	PCM	Go To Pinpoint Test B .
P1450	Excessive vacuum detected in the fuel tank	PCM	Go To Pinpoint Test C .
—	Any other PCM DTC	PCM	REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.

Symptom Chart

SYMPTOM CHART

Condition	Possible Sources	Action
• Hissing sound when removing fuel cap	• Canister vent solenoid. • Evaporative emissions canister. • Fuel vapor control valve	• Go To Pinpoint Test D .

	tube assembly. ● EVAP canister tube. ● EVAP canister purge outlet tube.	
● Excessive fuel odor	● Canister vent solenoid. ● Evaporative emissions canister. ● Fuel vapor control valve tube assembly. ● Evaporative emissions test port. ● EVAP canister purge outlet tube.	● Go To Pinpoint Test E .
● Unable to refuel vehicle	● Fuel filler pipe. ● Canister vent solenoid. ● Fuel vapor control valve tube assembly.	● Go To Pinpoint Test D .

Pinpoint Tests

NOTE: Reinstall or install new evaporative emission hose clamps removed or damaged during testing procedures.

PINPOINT TEST A: DTC P0442 SMALL LEAK IN EVAP SYSTEM

Test Step	Result / Action to Take
NOTE: Condition P0442 DTC set: less than 0.625 kPa (2.5 inches H_2O) bleed-up over 15 seconds at 75% fuel fill. Vapor generation limit: more than 0.625 kPa (2.5 inches H_2O) over 120 seconds.	
A1 VISUALLY INSPECT THE COMPONENTS FOR SMALL LEAKS ● Check for the presence of a fuel filler cap. Do not tighten or check for correct installation at this time. ● Verify the canister vent solenoid is correctly seated on the EVAP canister. ● Check for cut or loose connections to fuel vapor hoses, tubes and connections in the following locations: ■ EVAP canister to EVAP canister purge valve ■ EVAP canister to fuel vapor vent valve assembly ■ fuel vapor control valve tube assembly to fuel tank ● Check the fuel filler pipe for damage. ● **Is a concern with a hose, tube, connection or valve visually evident?**	**Yes** REPAIR or INSTALL new components as necessary.GO to A2 . **No** GO to A2 .
A2 CHECK AT THE EVAP TEST PORT FOR SMALL SYSTEM LEAKS ● Disconnect and plug the evaporative emission return tube at the intake	**Yes** GO to A3 .

manifold. ● Complete the evaporative emission system leak test. Refer to Evaporative Emission System Leak Test in this section. ● **Does the system pass the leak test?**	**No** GO to A4.
A3 VISUALLY INSPECT THE FUEL FILLER CAP	
● Visually inspect the fuel filler cap for damage. ● **Is the fuel filler cap damaged?**	**Yes** INSTALL a new fuel filler cap. GO to A4. **No** GO to A4.
A4 CHECK FOR SMALL LEAKS AT THE FUEL FILLER CAP AND EVAP TEST PORT	
● Connect the Evaporative Emission System Leak Tester to the fuel filler pipe. ● Key in ON position. ● Close the canister vent solenoid. Refer to Canister Vent Solenoid Closing Procedure in this section. ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● Using the ultrasonic leak detector, check the fuel filler cap and EVAP test port for leaks. ● **Is a leak detected?**	**Yes** REPAIR or INSTALL new components as necessary. GO to A5. **No** INSTALL the fuel filler cap. CARRY OUT the evaporative emission system leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emissions repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section.
A5 CHECK FOR CONCERN OTHER THAN THE FUEL FILLER CAP	
● Refer to previous test results. ● **Did the system pass the evaporative emission system leak test carried out in pinpoint test Step A2?**	**Yes** CARRY OUT the evaporative emission system leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** INSTALL the fuel filler cap. GO to A6.
A6 CHECK FOR SMALL LEAK WITH TESTER SET AT FILL POSITION	
● Connect the Evaporative Emission System Leak Tester to the EVAP test port. ● Key in ON position. ● Close the canister vent solenoid. Refer to Canister Vent Solenoid Closing Procedure in this section. ● Turn the selector on the Evaporative Emission System Leak Tester to the FILL position. ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure on the EVAP system hold between 3.43 kPa and 3.53 kPa (13.80 inches and 14.20**	**Yes** GO to A7. **No** DISCONTINUE pressurizing the system. GO to A8.

inches H_2O)?	

A7 CHECK FOR LEAKS IN THE COMPLETE EVAP SYSTEM
• Connect the Evaporative Emission System Leak Tester to the EVAP test port.
• Key in ON position.
• Close the canister vent solenoid. Refer to Canister Vent Solenoid Closing Procedure in this section.
• Pressurize the EVAP system to 3.48 kPa (14 inches H_2O).
• Using the ultrasonic leak detector, check the following EVAP system locations:
  ■ EVAP return tube to EVAP canister purge valve
  ■ EVAP canister purge valve to EVAP canister— canister vent solenoid assembly
  ■ EVAP canister — canister vent solenoid assembly to fuel tank
  ■ fuel filler cap and fuel filler tube
• **Is a leak detected at EVAP return tube, EVAP canister purge outlet tube or EVAP canister tube or associated hose?**
	Yes
	REPAIR or INSTALL new components as necessary. CARRY OUT the evaporative emission system leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emissions repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section.
	
	No
	DISCONTINUE pressurizing the system. GO to A8.

A8 CHECK FOR SMALL LEAK FROM THE EVAP RETURN TUBE TO THE FUEL VAPOR TEE • Disconnect the EVAP canister purge outlet tube at the fuel vapor tee. Plug the opening in the EVAP canister purge outlet tube. • Connect the Evaporative Emission System Leak Tester to the EVAP test port. • Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). • Using the ultrasonic leak detector, check the EVAP system from the intake manifold to the EVAP canister purge outlet tube. • **Is a leak detected?**	**Yes** REPAIR or INSTALL new components as necessary. REPEAT Step A6 to verify the repair. GO to A9. **No** GO to A9.
A9 CHECK FOR SMALL LEAK BETWEEN EVAP CANISTER AND FUEL TANK FILLER PIPE • Connect the Evaporative Emission System Leak Tester to the fuel filler pipe. • Transfer the plug from the EVAP canister purge outlet tube to the fuel vapor tee. • Turn the Evaporative Emission System Leak Tester selector to the FILL position. • Key in ON position. • Close the canister vent solenoid. Refer to Canister Vent Solenoid Closing	**Yes** REPAIR or INSTALL new components as necessary. GO to A10. **No** GO to A10.

Procedure in this section. ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● Using the ultrasonic leak detector, check the fuel vapor control valve tube to the fuel tank for leaks. Check the fuel tank pressure sensor, fuel vapor control valve tube and the fuel filler pipe. Check fuel tank to EVAP canister - canister vent solenoid. ● **Is a leak detected?**	
A10 CHECK EVAP SYSTEM AT FUEL FILLER PIPE ● Reconnect the EVAP canister purge outlet tube to the fuel vapor tee. ● Complete the evaporative emission system leak test. Refer to Evaporative Emission System Leak Test in this section. ● **Does the EVAP system pass the leak test?**	**Yes** RESTORE the system to normal operation. CARRY OUT the evaporative emission system leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emissions repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to A6.

PINPOINT TEST B: DTC P0455 MAJOR LEAK OR NO FLOW DETECTED OR DTC P1443 VERY SMALL OR NO PURGE FLOW DETECTED IN SYSTEM

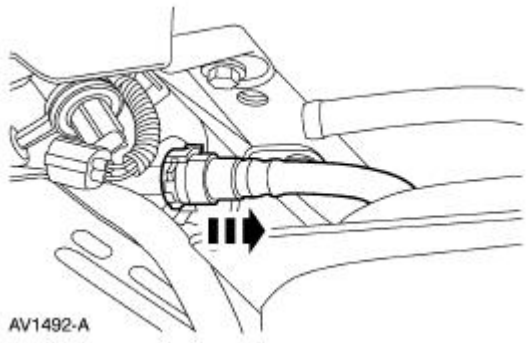
Test Step	Result / Action to Take
NOTE: Condition DTC P0455 set: –1.74 kPa (-7.0 inches H_2O) over 30 seconds.	
NOTE: Condition DTC P1443 set: –1.74 kPa (-7.0 inches H_2O) over 30 seconds with more than 0.02 lb/min vapor flow.	
B1 CHECK FOR DIAGNOSTIC TROUBLE CODE P0455 OR P1443 ● Use the recorded results from the PCM DTCs. ● **Is DTC P0455 present?**	**Yes** GO to B2. **No** GO to B3.
B2 VISUALLY CHECK FOR GROSS EVAP SYSTEM LEAKS ● Check for the presence of a fuel filler cap. Do not tighten or check for correct installation at this time. ● Check the input port vacuum and EVAP return tube are connected to the EVAP canister purge valve. ● Check that the canister vent solenoid is correctly attached to the EVAP	**Yes** REPAIR or INSTALL new EVAP components as necessary. GO to B3. **No** GO to B3.

canister. ● Check for disconnected or cracked fuel vapor hoses or tubes between the intake manifold and following components: ■ EVAP canister purge valve ■ EVAP canister ■ fuel vapor vent valve assembly ■ fuel vapor control valve tube assembly ● Check for damaged fuel tank or fuel filler pipe. ● **Is a concern with a hose, tube, connection or valve visually evident?**	
B3 CHECK FOR EVAP SYSTEM LEAKS ● Disconnect the EVAP return tube from the intake manifold and plug the EVAP return tube. ● Connect the Evaporative Emissions System Leak Tester to the EVAP test port. ● Carry out the evaporative emissions system leak test. Refer to Evaporative Emission System Leak Test in this section. ● **Does the system pressure stay above 1.99 kPa (8 inches H_2O)?**	**Yes** GO to B4 . **No** VERIFY that the fuel filler cap is installed correctly. REPAIR or INSTALL new components as necessary. CARRY OUT the evaporative emission system leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section.
B4 CHECK FOR BLOCKAGE BETWEEN THE EVAP CANISTER PURGE VALVE AND FUEL VAPOR TEE ● Key in ON position. ● Close the canister vent solenoid. Refer to Canister Vent Solenoid Closing Procedure in this section. ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● Open the canister vent solenoid. Refer to Canister Vent Solenoid Closing Procedure in this section. ● **Does the pressure drop immediately?**	**Yes** GO to B5 . **No** INSTALL a new vapor line between the EVAP canister purge valve and the fuel vapor tee. CARRY OUT the evaporative emission system leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section.
B5 CHECK FOR BLOCKAGE BETWEEN FUEL FILLER PIPE AND THE FUEL VAPOR TEE ● Connect the Evaporative Emissions System Leak	**Yes** GO to B6 .

Tester to the fuel filler pipe. • Pressurize the EVAP system to 6.47 to 6.97 kPa (26 to 28 inches H_2O). • **Does the pressure drop immediately?**	**No** INSTALL new fuel tank vapor line(s). REPEAT pinpoint test Step B5 to verify the repair. CARRY OUT the evaporative emission system leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section.
B6 CHECK FOR FAILED EVAP CANISTER PURGE VALVE OR FUEL TANK PRESSURE SENSOR	
• Use the recorded results from the PCM DTCs. • **Are DTC codes P0455 and P1443 present?**	**Yes** INSTALL a new EVAP canister purge valve. REFER to Evaporative Emission Canister Purge Valve in this section. CARRY OUT the evaporative emission system leak test. REFER to Evaporative Emission System Leak Test in this section. If no leak is detected, CARRY OUT the evaporative emissions repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** INSTALL a new fuel tank pressure sensor. REFER to Fuel Tank Pressure Sensor in this section. CARRY OUT the evaporative emission system leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY out the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section.

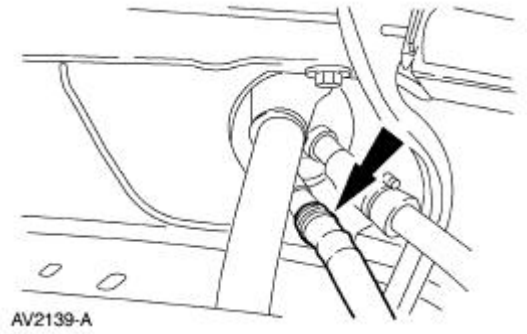
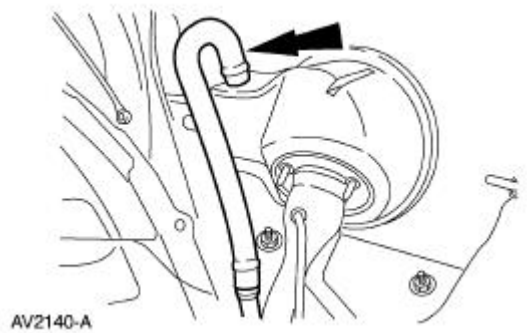
PINPOINT TEST C: DTC P1450 EXCESSIVE VACUUM DETECTED IN THE FUEL TANK

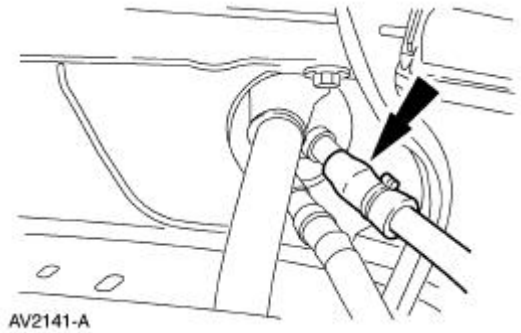
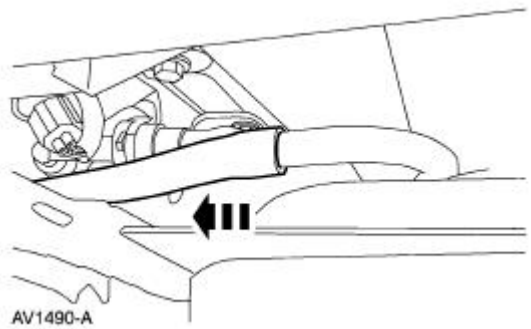
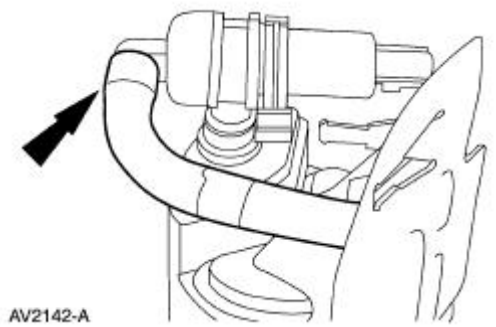
Test Step	Result / Action to Take
NOTE: Condition P1450 DTC set: more than -1.79 kPa (-7.2 inches H_2O) over 30 seconds.	
C1 CHECK FOR VISUAL CAUSES OF EXCESSIVE FUEL TANK VACUUM	
• Check for kinks or bends in the fuel vapor hoses and tubes. • Visually check the EVAP canister inlet port, canister vent solenoid filter or outlet hose for contamination or foreign material. • Check the canister vent solenoid for blockage or contamination. • **Is a concern with a hose, tube, connection or component visually evident?**	**Yes** REMOVE any contamination or foreign material around fuel vapor hoses and tubes. REPAIR the hoses, tubes or components as necessary. After all visual concerns are repaired, GO to C2. **No** GO to C2.
C2 CHECK FOR BLOCKAGE BETWEEN EVAP TEST PORT AND CANISTER VENT SOLENOID	
• Disconnect and plug the EVAP return tube at the intake manifold. • Connect the Evaporative Emissions System Leak Tester to the EVAP test port.	**Yes** GO to C3. **No**

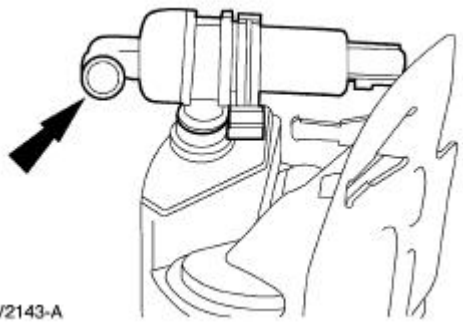
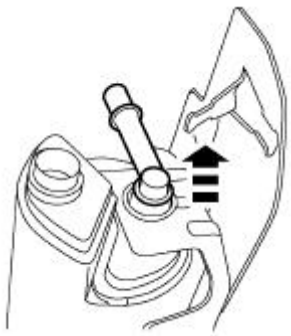
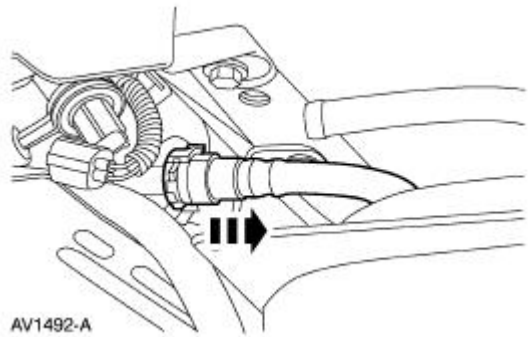
• Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). • **Does the pressure drop immediately?**	GO to Pinpoint Test D .
C3 CHECK FOR BLOCKAGE BETWEEN THE FUEL FILLER PIPE AND THE FUEL VAPOR TEE • Connect the Evaporative Emission System Leak Tester to the fuel filler pipe. • Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). • **Does the pressure drop immediately?**	**Yes** GO to C4 . **No** GO to Pinpoint Test D .
C4 CHECK FOR FUEL TANK PRESSURE SENSOR PID WITHOUT PRESSURE APPLIED • Disconnect the EVAP canister outlet tube at the EVAP canister.  • Key in ON position. • Access PCM PID FTP V. • Record the reading. • **Is PID FTP V reading between 2.40 and 2.80 volts?**	**Yes** GO to C5 . **No** REFER to Powertrain Control/Emissions Diagnosis (PC/ED) manual to continue diagnosis.
C5 CHECK FOR STUCK OPEN EVAP CANISTER PURGE VALVE CONDITION AT IDLE • Connect the EVAP canister outlet tube. • Remove the plug from the EVAP return tube and reconnect the tube to the intake manifold. • Verify that the fuel filler cap is correctly installed. • Key in ON position. • Access PCM PIDs FTP V and EVAPPDC. • Start the engine and allow to idle. • Monitor the FTP V and EVAPPDC PIDs. • **When PID EVAPPDC is zero, is PID FTP V reading below 2.40 volts?**	**Yes** INSTALL a new EVAP canister purge valve. REFER to Evaporative Emission Canister Purge Valve in this section. CARRY OUT an EVAP system leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT an evaporative emissions repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** CARRY OUT the EVAP system leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emissions repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section.

PINPOINT TEST D: HISSING SOUND WHEN REMOVING FUEL CAP

Test Step	Result / Action to Take
D1 TEST FOR FUEL TANK PRESSURE SENSOR OPERATION • Key in OFF position. • Connect the Evaporative Emission System Leak Tester to the fuel filler pipe. • Close the canister vent solenoid. Refer to Canister Vent Solenoid Closing Procedure in this section. • Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). • **Is the FTP (FTP V) PID reading 3.11 kPa to 3.86 kPa (12.5 to 15.5 inches H_2O) (4.22 to 4.90 volts)?**	**Yes** GO to D2 . **No** GO to D3 .
D2 TEST FOR BLOCKAGE IN VENTING PORTION OF EVAP SYSTEM • Open the canister vent solenoid by selecting the STOP button on the scan tool. • **Does the pressure drop immediately?**	**Yes** CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to D7 .
D3 TEST FOR FUEL TANK PRESSURE SENSOR OPERATION • Connect the Evaporative Emission System Leak Tester to the evaporative emission test port. • Close the canister vent solenoid. Refer to Canister Vent Solenoid Closing Procedure in this section. • Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). • **Is the FTP (FTP V) PID reading 3.11 kPa to 3.86 kPa (12.5 to 15.5 inches H_2O) (4.22 to 4.90 volts)?**	**Yes** GO to D4 . **No** REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.
D4 TEST TO DETERMINE BLOCKAGE LOCATION • Open the canister vent solenoid. • **Does the pressure drop immediately?**	**Yes** GO to D5 . **No** GO to D7 .
D5 TEST FOR PINCHED FUEL VAPOR CONTROL VALVE TUBE • Lower the fuel tank 19.05 mm (3/4 inch). • Connect the Evaporative Emission System Leak Tester to the fuel filler pipe. • Close the canister vent solenoid. Refer to Canister Vent Solenoid Closing Procedure in this section. • Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). • **Is the FTP (FTP V) PID reading 3.11 kPa to 3.86 kPa (12.5 to 15.5 inches H_2O) (4.22 to 4.90 volts)?**	**Yes** INSTALL a new fuel vapor control valve tube assembly. REFER to Fuel Vapor Control Tube Assembly Valve in this section. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section.

	No GO to D6 .
D6 TEST FOR BLOCKAGE IN FUEL FILLER TUBE ASSEMBLY ● Disconnect the tank vapor recirculation tube from the fuel filler pipe and plug both openings.  AV2139-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● Remove the plug from the vapor recirculation tube. ● **Does the pressure drop immediately?**	**Yes** INSTALL a new fuel vapor control valve tube assembly. REFER to Fuel Vapor Control Tube Assembly Valve in this section. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** INSTALL a new fuel filler pipe assembly. REFER to Section 310-01 . CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section.
D7 TEST FOR BLOCKAGE IN FRESH AIR VENT HOSE ● Disconnect the fresh air vent hose from the fuel filler pipe inside the luggage compartment.  AV2140-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	**Yes** INSTALL a new fresh air vent hose. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to D8 .
D8 TEST FOR BLOCKAGE IN THE FRESH AIR TUBE ON THE FUEL FILLER PIPE ASSEMBLY ● Disconnect the fresh air tube from the fuel filler pipe assembly.	**Yes** INSTALL a new fuel filler pipe assembly. REFER to Section 310-01 . CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to

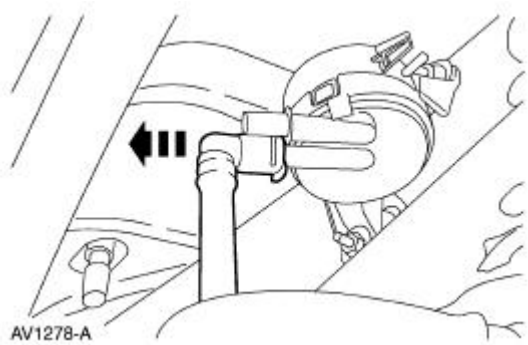
 AV2141-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to D9.
D9 TEST FOR BLOCKAGE IN THE TANK VAPOR VALVE ASSEMBLY—FRESH AIR TUBE ● Disconnect the tank vapor valve assembly—fresh air tube from the canister vent solenoid vent hose.  AV1490-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	**Yes** INSTALL a new tank vapor valve assembly—fresh air tube. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to D10.
D10 TEST FOR BLOCKAGE IN CANISTER VENT SOLENOID HOSE ● Disconnect the canister vent solenoid hose from the canister vent solenoid.  AV2142-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	**Yes** INSTALL a new canister vent solenoid hose. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to D11.
D11 TEST FOR BLOCKAGE IN CANISTER VENT SOLENOID ● Disconnect the canister vent solenoid from the evaporative emissions canister. Refer to Evaporative Emission Canister Vent Solenoid in this section.	**Yes** INSTALL a new canister vent solenoid. REFER to Evaporative Emission Canister Vent Solenoid in

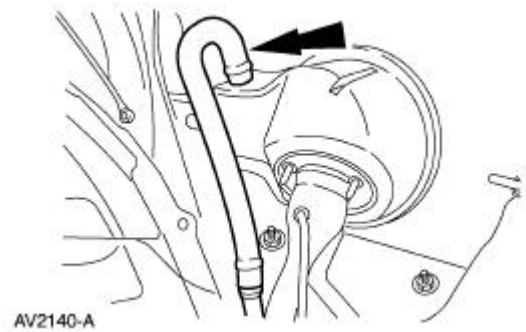
 AV2143-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	this section. CARRY OUT a leak test. REFER Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to D12 .
D12 TEST FOR BLOCKAGE IN EVAPORATIVE EMISSIONS CANISTER ● Disconnect the evaporative emissions canister inlet elbow from the evaporative emissions canister.  AV1497-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	**Yes** INSTALL a new evaporative emissions canister. REFER to Evaporative Emission Canister in this section. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to D13 .
D13 TEST FOR BLOCKAGE IN CANISTER INLET ELBOW ● Disconnect the fuel vapor control valve tube assembly from the evaporative emissions canister inlet elbow.  AV1492-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	**Yes** INSTALL a new evaporative emissions canister inlet elbow. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** INSTALL a new fuel vapor control valve tube assembly. REFER to Fuel Vapor Control Tube Assembly Valve in this section. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative

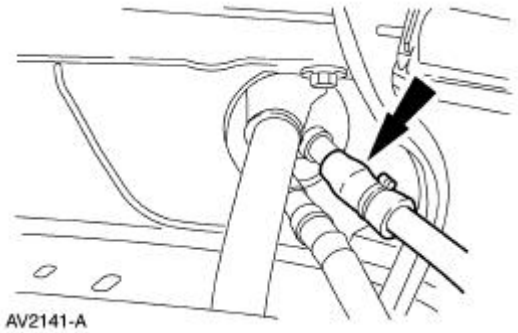
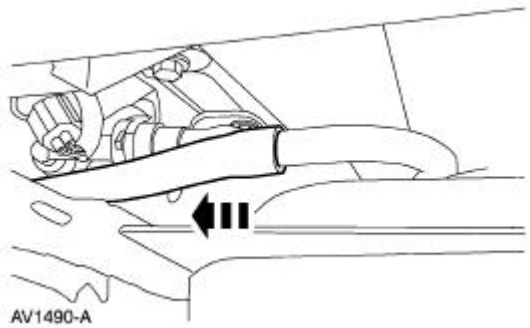
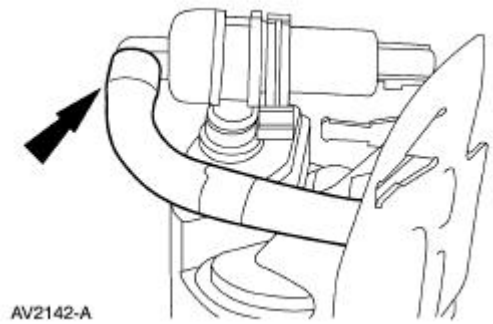
	Emission Repair Verification Drive Cycle in this section.

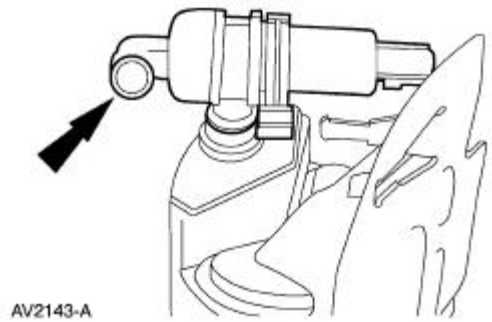
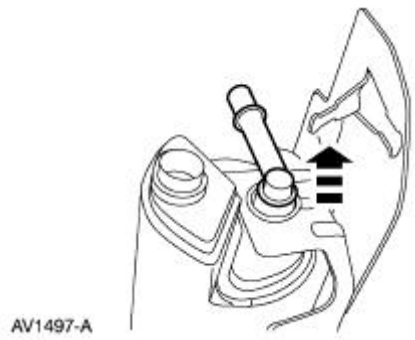
PINPOINT TEST E: EXCESSIVE FUEL ODOR

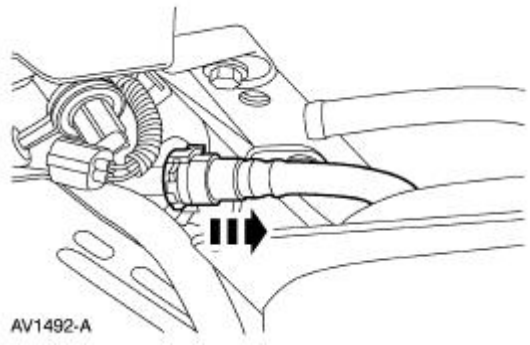
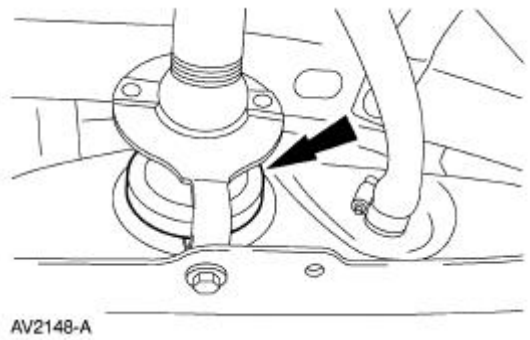
Test Step	Result / Action to Take
E1 EVAPORATIVE EMISSION SYSTEM LEAK TEST	
• Carry out the Evaporative Emission System Leak Test procedure. Refer to Evaporative Emission System Leak Test in this section. • **Does the EVAP system pass the leak test?**	**Yes** GO to E2. **No** GO to E3.
E2 CARRY OUT THE EVAPORATIVE EMISSION SYSTEM RUNNING LOSS MONITOR REPAIR VERIFICATION DRIVE CYCLE	
• Carry out the Evaporative Emission Running Loss Monitor Repair Verification Drive Cycle; refer to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. • **Are the powertrain control module DTCs retrieved?**	**Yes** For DTCs P0442, P0455, P1443, and P1450 REFER to the Diagnostic Trouble Code (DTC) Index in this section. For all other DTCs, REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual for diagnosis of the DTCs. **No** EVAP system diagnosis complete. REFER to Symptom Chart.
E3 ISOLATE SYSTEM LEAK FROM FRONT TO REAR	
• Disconnect EVAP canister purge outlet tube from fuel vapor control valve tube assembly and plug both ends. • Connect the Evaporative Emission System Leak Tester to the evaporative emissions test port. • Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). • **Does the pressure drop immediately?**	**Yes** GO to E4. **No** GO to E9.
E4 TEST FUEL VAPOR HOSE FROM FUEL TANK TO TUBE ASSEMBLY FUEL SUPPLY-RETURN AND VAPOR	
• Disconnect the fuel vapor return hose from the tube assembly fuel supply-return and vapor under vehicle, and plug the fuel supply-return and vapor tube assembly. • Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). • **Does the pressure drop immediately?**	**Yes** GO to E5. **No** INSTALL a new fuel vapor return hose. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test on this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section.
E5 TEST THE FUEL SUPPLY-RETURN AND VAPOR TUBE ASSEMBLY	

• Disconnect the fuel supply-return and vapor tube assembly from the EVAP canister purge outlet tube, and plug the EVAP canister purge outlet tube. • Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). • **Does the pressure drop immediately?**	**Yes** GO to E6 . **No** INSTALL a new fuel supply-return and vapor tube assembly. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test on this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section.
E6 TEST FOR EVAPORATIVE EMISSIONS TEST PORT LEAK	
• Disconnect the evaporative emissions test port tube from the EVAP canister purge outlet tube and plug the evaporative emissions test port tube. • Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). • **Does the pressure drop immediately?**	**Yes** INSTALL a new evaporative emissions test port. REFER to Evaporative Emission Test Port . CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test on this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** RECONNECT the evaporative emissions test port tube to the EVAP canister purge outlet tube. GO to E7 .
E7 TEST FOR EVAP CANISTER PURGE OUTLET TUBE LEAK	
• Disconnect the EVAP canister purge outlet tube from the evaporative emissions canister purge valve and plug the EVAP canister purge outlet tube.  • Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). • **Does the pressure drop immediately?**	**Yes** INSTALL a new EVAP canister purge outlet tube. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test on this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** RECONNECT the EVAP canister purge outlet tube. GO to E8 .
E8 TEST FOR LEAK AT EVAPORATIVE EMISSIONS PURGE VALVE	
• Disconnect the evaporative emissions return tube from the evaporative emissions canister purge	**Yes** INSTALL a new evaporative

valve and plug the evaporative emissions canister purge valve. ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	emissions canister purge valve. REFER to Evaporative Emission Canister Purge Valve in this section. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test on this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** INSTALL a new evaporative emissions return tube. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test on this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section.
E9 TEST FOR BLOCKAGE IN VENTING PORTION OF EVAP SYSTEM	
● Reconnect all components. ● Connect the Evaporative Emission System Leak Tester to the fuel filler pipe. ● Close the canister vent solenoid. Refer to Canister Vent Solenoid Closing Procedure in this section. ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● Open the canister vent solenoid. ● **Does the pressure drop immediately?**	**Yes** GO to E14 . **No** GO to E10 .
E10 TEST FOR BLOCKAGE IN THE FRESH AIR VENT HOSE	
● Disconnect the fresh air vent hose from the fuel filler pipe inside the luggage compartment.  ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	**Yes** INSTALL a new fresh air vent hose. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to E11 .
E11 TEST FOR BLOCKAGE IN THE FRESH AIR TUBE ON THE FUEL FILLER PIPE ASSEMBLY	
● Disconnect the fresh air tube from the fuel filler pipe assembly.	**Yes** INSTALL a new fuel filler pipe

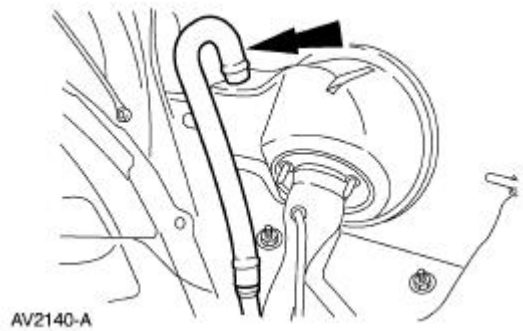
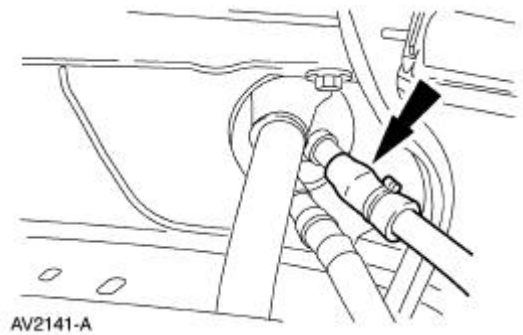
 AV2141-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	assembly. REFER to Section 310-01 . CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to E12 .
E12 TEST FOR BLOCKAGE IN THE FUEL VAPOR CONTROL VALVE TUBE ASSEMBLY—FRESH AIR TUBE ● Disconnect the fuel vapor control valve tube assembly—fresh air tube from the canister vent solenoid vent hose.  AV1490-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	**Yes** INSTALL a new fuel vapor control valve tube assembly—fresh air tube. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to E13 .
E13 TEST FOR BLOCKAGE IN CANISTER VENT SOLENOID HOSE ● Disconnect the canister vent solenoid hose from the canister vent solenoid.  AV2142-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	**Yes** INSTALL a new canister vent solenoid hose. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** INSTALL a new canister vent solenoid. REFER to Evaporative Emission Canister Vent Solenoid in this section. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative

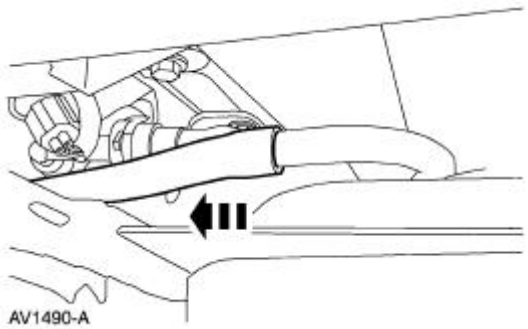
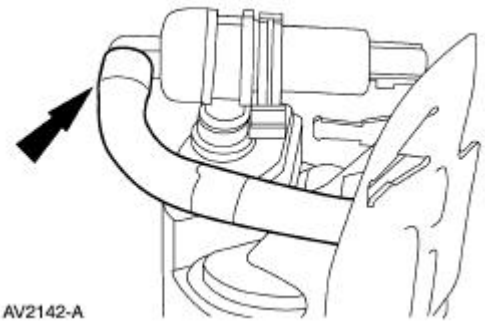
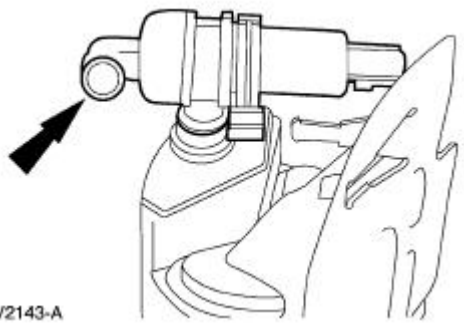
	Emission Repair Verification Drive Cycle in this section.
E14 TEST FOR LEAK IN EVAPORATIVE EMISSIONS CANISTER	
• Carry out the Evaporative Emission Canister and Bracket Assembly Leak Test. Refer to Evaporative Emission System Leak Test in this section. • **Does the EVAP system pass the leak test?**	**Yes** EVAP system diagnosis complete. GO to E18 . **No** GO to E15 .
E15 TEST FOR CANISTER VENT SOLENOID LEAK	
• Disconnect the canister vent solenoid from the evaporative emissions canister and plug the canister.  AV2143-A • Carry out the evaporative emission system leak test. Refer to Evaporative Emission System Leak Test in this section. • **Does the EVAP system pass the leak test?**	**Yes** INSTALL a new canister vent solenoid. REFER to Evaporative Emission Canister Vent Solenoid in this section. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to E16 .
E16 TEST FOR CANISTER LEAK	
• Disconnect the EVAP canister inlet elbow from the evaporative emissions canister and plug the EVAP canister inlet elbow.  AV1497-A • Carry out the evaporative emission system leak test. Refer to Evaporative Emission System Leak Test in this section. • **Does the EVAP system pass the leak test?**	**Yes** INSTALL a new EVAP canister assembly. REFER to Evaporative Emission Canister in this section. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to E17 .
E17 TEST FOR CANISTER INLET ELBOW LEAK	
• Disconnect the fuel vapor control valve tube assembly from the EVAP canister inlet elbow and plug the fuel vapor control valve tube assembly.	**Yes** INSTALL a new evaporative emissions canister inlet elbow. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair

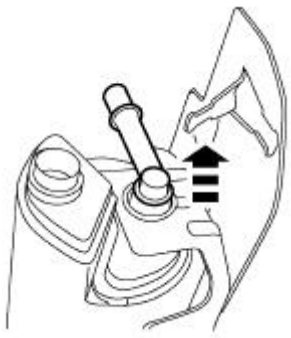
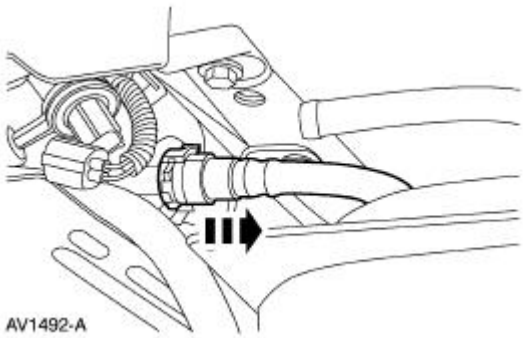
 AV1492-A ● Carry out the evaporative emissions system leak test. Refer to Evaporative Emission System Leak Test in this section. ● **Does the EVAP system pass the leak test?**	verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** INSTALL a new fuel vapor control valve tube assembly. REFER to Fuel Vapor Control Tube Assembly Valve in this section. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section.
E18 TEST FOR LEAKAGE IN FUEL FILLER PIPE GROMMET	
● Reconnect all components. ● Connect the Evaporative Emission System Leak Tester to the fuel filler pipe. ● Close the canister vent solenoid. Refer to Canister Vent Solenoid Closing Procedure in this section. ● Pressurize the system.  AV2148-A ● **Does the pressure drop?**	**Yes** INSPECT fuel filler pipe to tank grommet for cuts, abrasions or leaks. REFER to Section 310-00 for repair procedures. **No** CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section.

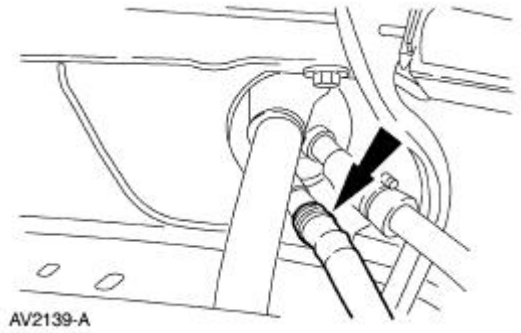
PINPOINT TEST F: UNABLE TO REFUEL VEHICLE (ORVR)

Test Step	Result / Action to Take
F1 TEST THE FUEL FILLER PIPE AND THE FUEL FILLER PIPE CHECK VALVE	
● Remove the fuel filler cap. ● Connect the Evaporative Emission System Leak Tester to the fuel filler pipe. ● Close the canister vent solenoid. Refer to Canister Vent Solenoid Closing Procedure in this section. ● Access PCM PID FTP V. ● Pressurize the EVAP System to 3.48 kPa (14 inches H_2O). ● **Is PID FTP V reading 3.11 kPa to 3.86 kPa (12.5 to 15.5 inches H_2O) (4.22 to 4.90 volts)?**	**Yes** GO to F2 . **No** GO to F10 .
F2 TEST THE EVAP SYSTEM FOR RESTRICTION	
● Connect the Evaporative Emission System Leak	**Yes**

Tester to the fuel filler pipe. ● Attempt to pressurize the EVAP System to 3.48 kPa (14 inches H_2O). ● **Does the system pressurize?**	GO to F3 . **No** CARRY OUT the evaporative emissions system leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emissions repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section.
F3 TEST FOR BLOCKAGE IN FRESH AIR VENT HOSE ● Disconnect the fresh air vent hose from the fuel filler pipe inside the luggage compartment.  AV2140-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	**Yes** INSTALL a new fresh air vent hose. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to F4 .
F4 TEST FOR BLOCKAGE IN THE FRESH AIR TUBE ON THE FUEL FILLER PIPE ASSEMBLY ● Disconnect the fresh air tube from the fuel filler pipe assembly.  AV2141-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	**Yes** INSTALL a new fuel filler pipe assembly. REFER to Section 310-01 . CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to F5 .
F5 TEST FOR BLOCKAGE IN THE TANK VAPOR VALVE ASSEMBLY—FRESH AIR TUBE ● Disconnect the tank vapor valve assembly—fresh air tube from the canister vent solenoid vent hose.	**Yes** INSTALL a new tank vapor valve assembly—fresh air tube. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT

 AV1490-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to F6.
F6 TEST FOR BLOCKAGE IN CANISTER VENT SOLENOID HOSE	
● Disconnect the canister vent solenoid hose from the canister vent solenoid.  AV2142-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	**Yes** INSTALL a new canister vent solenoid hose. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to F7.
F7 TEST FOR BLOCKAGE IN CANISTER VENT SOLENOID	
● Disconnect the canister vent solenoid from the evaporative emissions canister. Refer to Evaporative Emission Canister Vent Solenoid in this section.  AV2143-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	**Yes** INSTALL a new canister vent solenoid. REFER to Evaporative Emission Canister Vent Solenoid in this section. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to F8.
F8 TEST FOR BLOCKAGE IN EVAPORATIVE EMISSIONS CANISTER	
● Disconnect the evaporative emissions canister inlet elbow from the evaporative emissions canister.	**Yes** INSTALL a new evaporative emissions canister. REFER to

 AV1497-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	Evaporative Emission Canister in this section. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to F9 .
F9 TEST FOR BLOCKAGE IN CANISTER INLET ELBOW ● Disconnect the fuel vapor control valve tube assembly from the evaporative emissions canister inlet elbow.  AV1492-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Does the pressure drop immediately?**	**Yes** INSTALL a new evaporative emissions canister inlet elbow. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to F10 .
F10 TEST FOR PINCHED FUEL VAPOR CONTROL VALVE TUBE ● Lower the fuel tank 19.05 mm (3/4 inch). ● Connect the Evaporative Emission System Leak Tester to the fuel filler pipe. ● Close the canister vent solenoid. Refer to Canister Vent Solenoid Closing Procedure in this section. ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● **Is the FTP (FTP V) PID reading 3.11 kPa to 3.86 kPa (12.5 to 15.5 inches H_2O) (4.22 to 4.90 volts)?**	**Yes** INSTALL a new fuel vapor control valve tube assembly. REFER to Fuel Vapor Control Tube Assembly Valve in this section. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** GO to F11 .
F11 TEST FOR BLOCKAGE IN FUEL FILLER TUBE ASSEMBLY ● Disconnect the tank vapor recirculation tube from the fuel filler pipe and plug both openings.	**Yes** INSTALL a new fuel vapor control valve tube assembly. REFER to

 AV2139-A ● Pressurize the EVAP system to 3.48 kPa (14 inches H_2O). ● Remove the plug from the vapor recirculation tube. ● **Does the pressure drop immediately?**	Fuel Vapor Control Tube Assembly Valve in this section. CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section. **No** INSTALL a new fuel filler pipe assembly. REFER to Section 310-01 . CARRY OUT a leak test. REFER to Evaporative Emission System Leak Test in this section. If the system passes the leak test, CARRY OUT the evaporative emission repair verification drive cycle. REFER to Evaporative Emission Repair Verification Drive Cycle in this section.

Canister Vent Solenoid Closing Procedure

Special Tool(s)

ST2332-A	Worldwide Diagnostic System (WDS) 418-F224, New Generation STAR (NGS) Tester 418-F052, or equivalent scan tool

CAUTION: The canister vent solenoid must not be energized for more than nine minutes at one time. Once the canister vent solenoid is energized and de-energized, adequate time must be allowed for the component to cool adequately. Failure to allow the component to cool may create a false failure in the diagnostics, causing unnecessary repairs.

1. Connect the scan tool and select the output test mode.
2. If PID monitors are not active, select PIDs.
3. Select the fuel tank pressure (FTP) and the volts (V) parameter identification (PID) for monitoring.
4. Select the ALL OFF mode.
5. Close the canister vent solenoid by pushing the START button on the scan tool.

Evaporative Emission System Leak Test

Special Tool(s)

ST2116-A	Evaporative Emission System Tester 310-F007 (134-00056) or equivalent
ST2332-A	Worldwide Diagnostic System (WDS) 418-F224, New Generation STAR (NGS) Tester 418-F052, or equivalent scan tool

CAUTION: The evaporative emission system must not be pressurized to more than 3.48 kPa (14 inches H_2O) or damage to the evaporative emission system may occur.

1. Connect the Evaporative Emission System Leak Tester to the evaporative emission test port.
2. Close the canister vent solenoid. For additional information, refer to Canister Vent Solenoid Closing Procedure in this section.
3. Pressurize the evaporative emission system to 3.48 kPa (14 inches H_2O).
4. Monitor the system for two minutes. The system fails the leak test if the pressure falls below 2.0 kPa (8 inches H_2O).
5. Repair any leaks as necessary.
6. Repeat the leak test until the system remains above 2.0 kPa (8 inches H_2O) after the two-minute test period.

Evaporative Emission Repair Verification Drive Cycle

Special Tool(s)

ST2332-A	Worldwide Diagnostic System (WDS) 418-F224, New Generation STAR (NGS) Tester 418-F052, or equivalent scan tool

Drive Cycle Recommendations

NOTE: The following procedure is designed to execute and complete the evaporative emission repair verification drive cycle and to clear the Ford P1000, inspection and maintenance (I/M) readiness code. When the ambient air temperature is below 4.4°C (40°F) or above 37.8°C (100°F), or the altitude is above 2,438 meters (8,000 feet), the EVAP monitor will not run. If the P1000 must be cleared in these conditions, the powertrain control module (PCM) must detect them once (twice on some applications) before the EVAP monitor can be bypassed and the P1000 cleared. The EVAP bypassing procedure is described in the following drive cycle.

1. Most OBD II monitors will complete more readily using a steady foot driving style during cruise or acceleration modes. Operating the throttle in a smooth fashion will minimize the time necessary for monitor completion.

2. Fuel tank level should be between one-half and three-quarters full with three-quarters full being the most desirable.

3. The evaporative monitor can only operate during the first 30 minutes of engine operation. When executing the procedure for this monitor, stay in part throttle mode and drive in a smooth fashion to minimize fuel slosh.

Drive Cycle Preparation

NOTE: For best results, follow each of the following steps as accurately as possible.

4. **NOTE:** This step bypasses the engine soak timer and resets OBD II monitor status.

   Install the scan tool. Turn the key ON with the engine OFF. Cycle the key off, then on. Select the appropriate vehicle and engine qualifier. Clear all diagnostic trouble codes (DTCs) and carry out a PCM reset.

5. Begin to monitor the following PIDs: ECT, EVAPDC, FLI (if available) and TP MODE. Press Diagnostic Data Link, PCM, PID/Data monitor and record, press trigger to select each PID, then start.

6. Start the engine without returning the key to the OFF position.

Preparation for Monitor Entry

WARNING: Strict observance of posted speed limits and attention to driving conditions

are mandatory when proceeding through the following drive cycle.

7. **NOTE:** This step allows engine warm-up and provides intake air temperature (IAT) input to the PCM.

   Idle the vehicle for 15 seconds. Drive at 64 km/h (40 mph) until the ECT is at least 76.7°C (170° F).

8. Is IAT above 4.4°C (40°F) and below 37.8°C (100°F)? If not, continue with the following steps but note that the EVAP Monitor Bypass portion of the drive cycle (Step 13) will be required to bypass the EVAP monitor and clear the P1000.

9. **NOTE:** This step executes the heated oxygen sensor (HO2S) monitor.

   Cruise at 64 km/h (40 mph) for 60 seconds.

10. **NOTE:** This executes the EVAP monitor if IAT is above 4.4°C (40°F) and below 37.8°C (100°F).

    NOTE: To initiate the monitor, TP MODE should equal PT, EVAPDC must be greater than 75%, and FLI must be between 15 and 85%.

    NOTE: Avoid sharp turns and hills.

    Cruise at 72 to 104 km/h (45 to 65 mph) for 10 minutes.

11. **NOTE:** This step executes the ISC portion of the Secondary Air/CCM.

    Bring the vehicle to a stop. Idle with the transmission in DRIVE (for automatic transmission) or NEUTRAL (for manual transmission) for two minutes.

Pending Code and EVAP Monitor Bypass Check

12. **NOTE:** This determines if a pending code is preventing the clearing of P1000.

    NOTE: If the EVAP monitor is not complete and IAT was below 4.4°C (40°F) or above 37.8°C (100°F) temperature range in Step 8, or the altitude is above 2,438 meters (8,000 feet), the EVAP Monitor Bypass (Step 13) must be carried out.

    Using the scan tool, check for pending codes. Conduct normal repair procedures for any pending code concerns. Rerun any incomplete monitor.

EVAP Monitor Bypass

13. **NOTE:** This allows the bypass counter to increment to two.

    NOTE: Do not repeat Step 4.

    Park the vehicle for a minimum of eight hours. Repeat Steps 5 through 12.

Evaporative Emission Canister

Removal and Installation

1. **WARNING: The evaporative emission system contains fuel vapor and condensed fuel vapor. Although not in large quantities, it still presents the danger of explosion or fire. Disconnect the battery ground cable from the battery to minimize the possibility of an electrical spark occurring, possibly causing a fire or explosion if fuel vapor or liquid fuel is present in the area. Failure to follow these instructions may result in personal injury.**

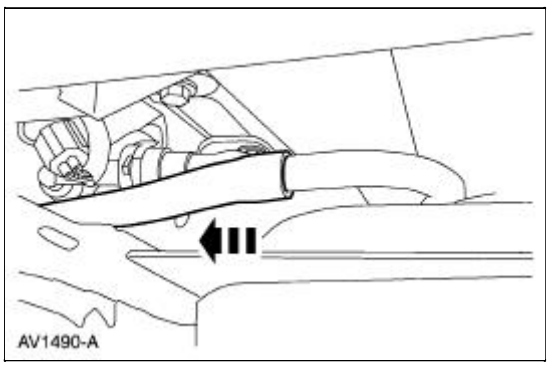
   Disconnect the battery ground cable. For additional information, refer to Section 414-01 .

2. Raise and support the vehicle. For additional information, refer to Section 100-02 .

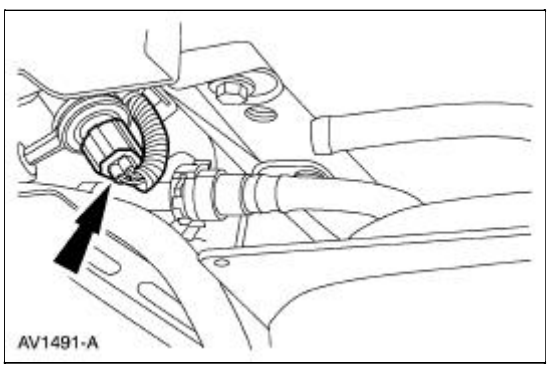
3. Remove the left rear wheel. For additional information, refer to Section 204-04 .

4. **WARNING: Do not smoke or carry lighted tobacco or open flame of any type when working on or around any fuel-related component. Highly flammable mixtures are always present and may be ignited. Failure to follow these instructions may result in personal injury.**

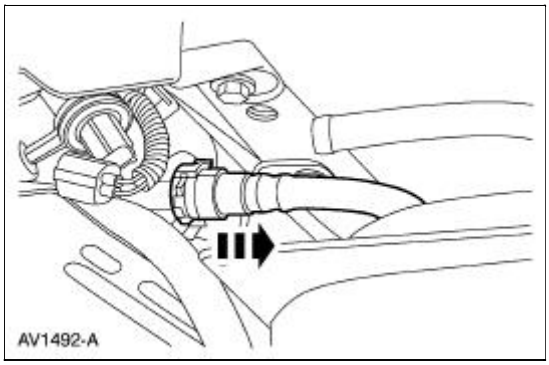
   Disconnect the canister vent solenoid hose assembly.



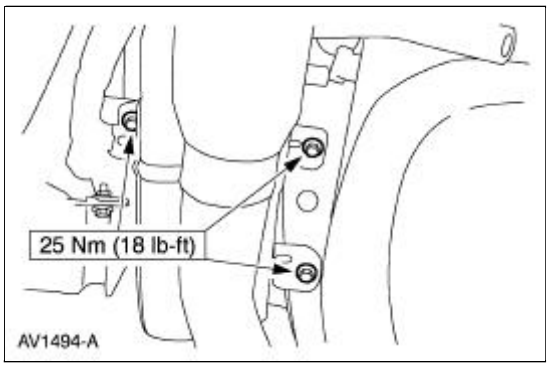
5. Disconnect the connector.



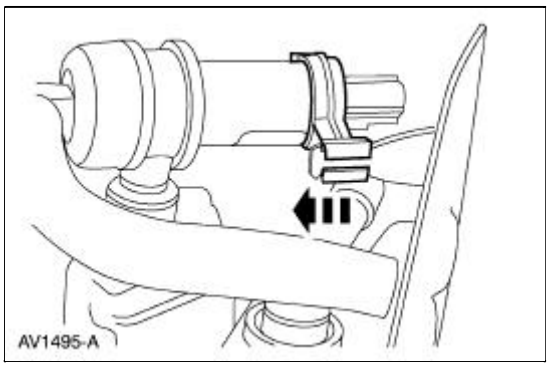
6. Disconnect the evaporative emission (EVAP) canister purge outlet tube.



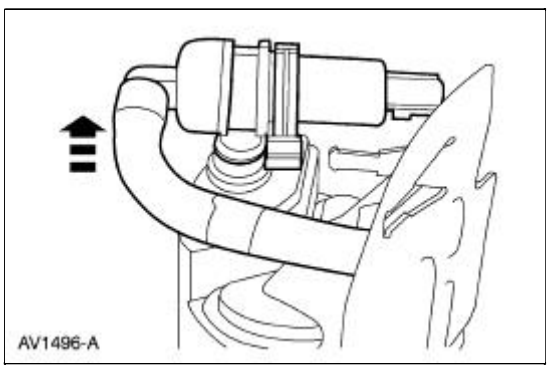
7. Remove the EVAP canister with bracket assembly from the vehicle.
    - Remove the bolts.



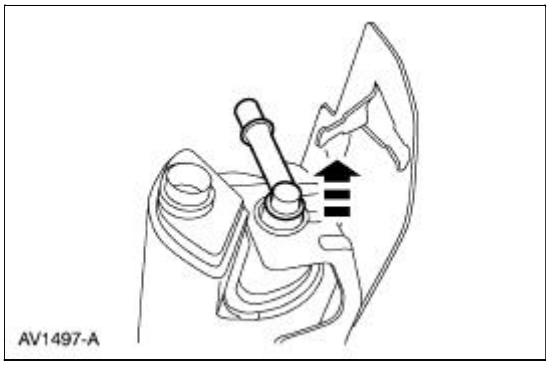
8. Disconnect the brace.



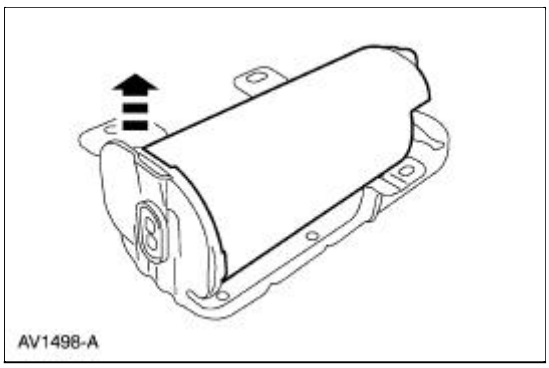
9. Remove the canister vent solenoid and canister vent solenoid hose assembly.



10. Remove the EVAP canister purge outlet tube elbow.



11. Remove the EVAP canister from the canister bracket.



12. To install, reverse the removal procedure.
    - Carry out a leak test. For additional information, refer to Evaporative Emission System Leak Test in this section.
    - Carry out the evaporative emission repair verification drive cycle. For additional information, refer to Evaporative Emission Repair Verification Drive Cycle in this section.

Evaporative Emission Canister Purge Valve

Removal and Installation

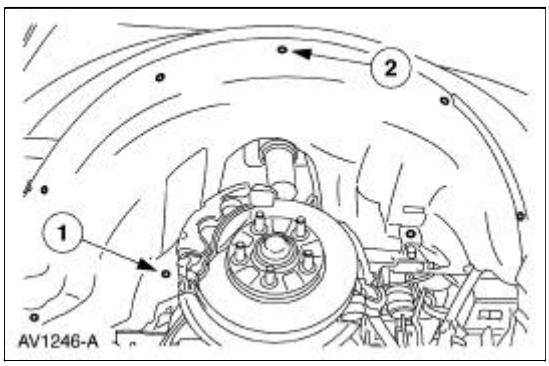
1. **WARNING: The evaporative emission system contains fuel vapor and condensed fuel vapor. Although not in large quantities, it still presents the danger of explosion or fire. Disconnect the battery ground cable from the battery to minimize the possibility of an electrical spark occurring, possibly causing a fire or explosion if fuel vapor or fuel liquid is present in the area. Failure to follow these instructions may result in personal injury.**

   Disconnect the battery ground cable. For additional information, refer to Section 414-01 .

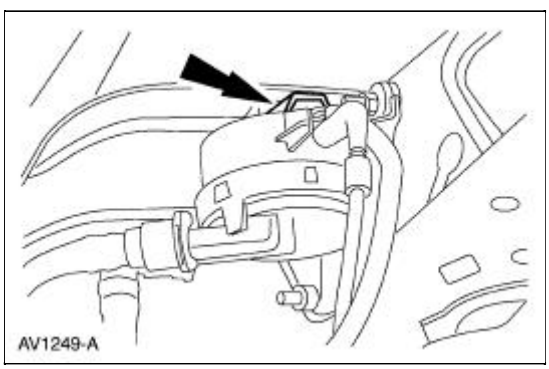
2. Raise and support the vehicle. For additional information, refer to Section 100-02 .

3. Remove the RH front wheel. For additional information, refer to Section 204-04 .

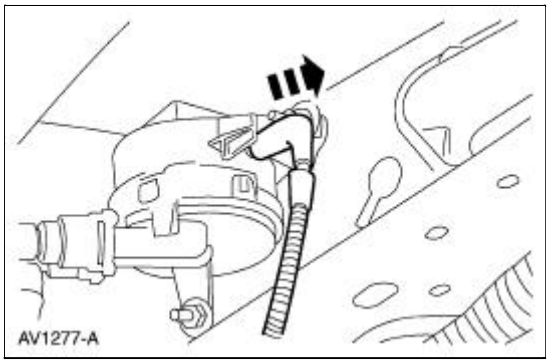
4. Remove the right front splash shield.
   1. Remove the three screws.
   2. Remove the five pin-type retainers.



5. Disconnect the connector.

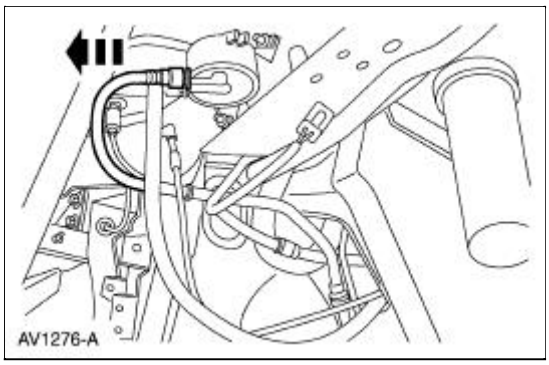


6. Disconnect the main emission vacuum control connector.

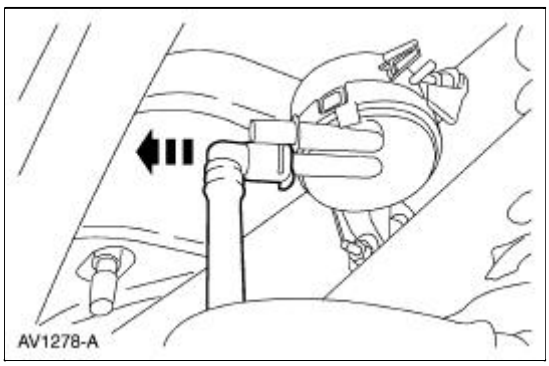


7. **WARNING: Do not smoke or carry lighted tobacco or open flame of any type when working on or around any fuel-related component. Highly flammable mixtures are always present and may be ignited. Failure to follow these instructions may result in personal injury.**

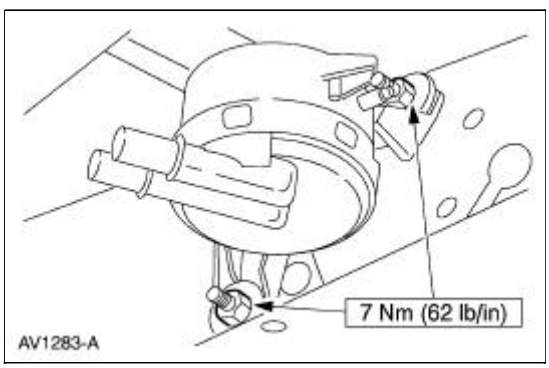
   Disconnect the evaporative emission (EVAP) canister purge outlet tube.



8. Disconnect the EVAP return tube.



9. Remove the nuts and the EVAP canister purge valve.



10. To install, reverse the removal procedure.
    - Leak test the system. For additional information, refer to Evaporative Emission System Leak Test in this section.
    - Carry out the evaporative emission repair verification drive cycle. For additional information, refer to Evaporative Emission Repair Verification Drive Cycle in this section.

Fuel Vapor Vent Valve

Removal and Installation

1. **NOTE:** The fuel vapor vent valve is repaired along with the fuel vapor control valve and the in-line fuel tank pressure sensor as a fuel vapor control valve tube assembly.

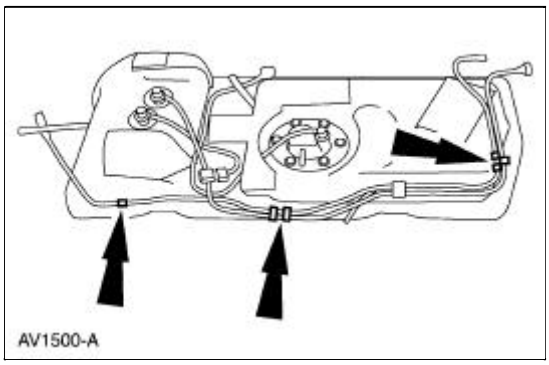
   For removal and installation of the fuel vapor vent valve, refer to Fuel Vapor Control Tube Assembly Valve in this section.

Fuel Vapor Control Tube Assembly Valve

Removal and Installation

1. Remove the fuel tank. For additional information, refer to Section 310-01 .

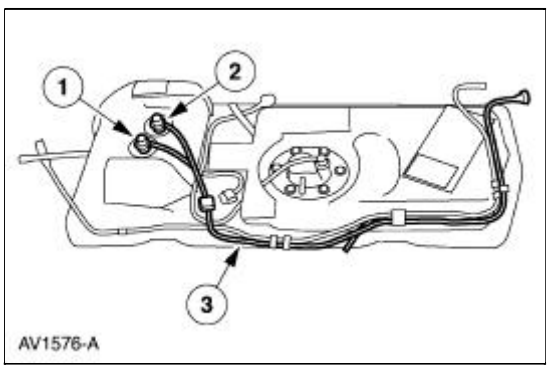
2. Remove the retainers.



3. **NOTE:** The fuel vapor vent valve, fuel vapor control valve and the in-line fuel tank pressure sensor are repaired as a fuel vapor control valve tube assembly.

   NOTE: It may be necessary to lubricate the fuel vapor control valve tube assembly grommets with ESE-M00B144-B Merpol® or equivalent to assist in the removal procedure.

   Remove the fuel vapor control valve tube assembly.
   1. Loosen the fuel vapor vent valve.
   2. Loosen the fuel vapor control valve.
   3. Remove the fuel vapor control valve tube assembly.



4. **NOTE:** Lubricate all O-ring seals with MERPOL® O-Ring Seal Lubricant or equivalent meeting Ford specification ESE-M99B144-B.

   NOTE: New grommets are necessary when the fuel vapor control valve tube assembly is removed.

   To install, reverse the removal procedure.

   - Leak test the system. For additional information, refer to Evaporative Emission System Leak Test in this section.
   - Carry out the evaporative emission repair verification drive cycle. For additional

information, refer to Evaporative Emission Repair Verification Drive Cycle in this section.

Fuel Tank Pressure Sensor

Removal and Installation

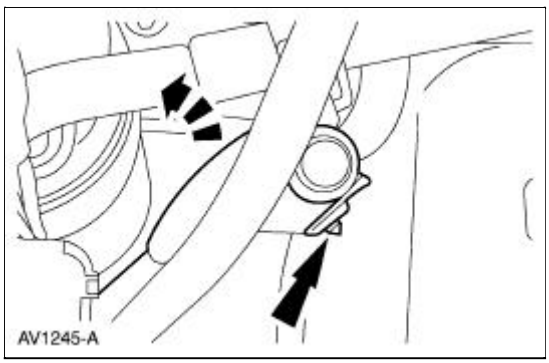
1. **NOTE:** The in-line fuel tank pressure sensor is repaired along with the fuel vapor vent valve and the fuel vapor control valve as a fuel vapor control valve tube assembly.

   For removal and installation of the fuel vapor control valve, refer to Fuel Vapor Control Tube Assembly Valve in this section.

Evaporative Emission Test Port

Removal and Installation

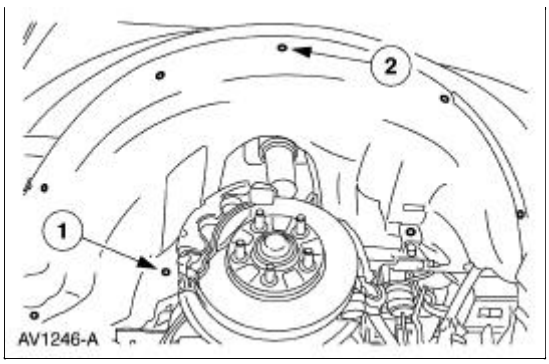
1. Disconnect the pin-type retainer.



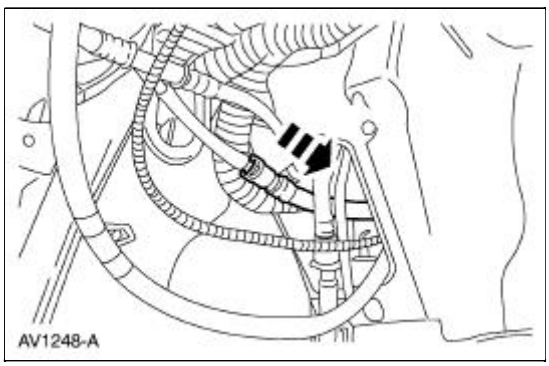
2. Raise and support the vehicle. For additional information, refer to Section 100-02 .

3. Remove the RH front wheel. For additional information, refer to Section 204-04 .

4. Remove the RH front splash shield.
    1. Remove the three screws.
    2. Remove the five pin-type retainers.



5. Remove the evaporative emission test port by disconnecting at the EVAP canister purge outlet tube junction.



6. To install, reverse the removal procedure.

- Leak test the system. For additional information, refer to Evaporative Emission System Leak Test in this section.
- Carry out the evaporative emission repair verification drive cycle. For additional information, refer to Evaporative Emission Repair Verification Drive Cycle in this section.

Evaporative Emission Canister Vent Solenoid

Removal and Installation

1. Remove the canister vent solenoid. For additional information, refer to Evaporative Emission Canister in this section.